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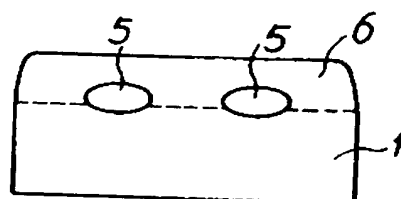
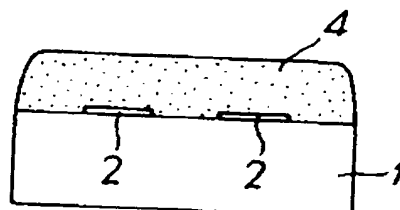
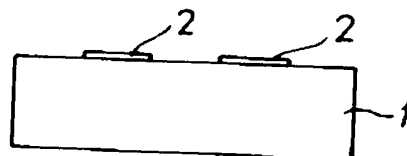
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TITLE : MANUFACTURE OF GLASS
WAVEGUIDE



ABSTRACT : PURPOSE: To obtain an embedded glass waveguide in a mass-producing manner while reducing the number of stages by patterning a diffusing substance on a polished glass substrate, depositing fine glass particles, and diffusing the patterned substance in a stage for converting the glass particles into transparent glass.

CONSTITUTION: An SiO_2 quartz glass substrate 1 is polished, the polished surface is lightly etched with an ammonium fluoride soln., and a film of metallic Ge 2 patterned by a lift-off method is deposited by a vapor deposition method using electron beams. Fine particles 4 of SiO_2 quartz glass formed by causing hydrolysis in an oxyhydrogen flame mixed with gaseous SiCl_4 are deposited on the substrate 1. The metallic Ge 2 converts into germanium oxide in the oxidizing atmosphere in the temp. rising stage. The substrate 1 is then annealed in a heating furnace filled with an oxidizing atmosphere. The fine particles 4 of SiO_2 quartz glass are made perfectly transparent by annealing at $1,300^\circ\text{C}$ for 2hr. Ge ions diffuse in quartz glass in said stage for converting the fine particles 4 into transparent glass, and a waveguide having a diffusion layer 5 embedded in quartz glass is obtd.

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